

FIRST DRAFT – EPA comments on Appendix D Toxins of BDCP “Effects Analysis”

General Comments

1. Information presented in this document appears to be incomplete and out of date.
2. This appendix needs to be integrated and reference the flows appendix. For example, the copper section describes copper toxicity varying with temperature. Similarly, restoration is intended to increase aquatic productivity which will increase dissolved organic carbon and pH. Changes in flow will likely change residence times and that will likely increase the impact of copper and other contaminants in fish, particularly in the south delta. Taking this argument one more step, the stabilized flow conditions are likely to allow more stable populations of overbite clams in the western delta and eastern Suisun Bay, which can be expected to increase the impacts of selenium on sturgeon and other benthic feeding fish. All of these kinds of interactive and cumulative effects are not addressed and need to be.
3. For example, stabilized flow conditions are likely to allow more stable populations of overbite clams in the western delta and eastern Suisun Bay, which can be expected to increase the impacts of selenium on sturgeon and other benthic feeding fish. All of these kinds of interactive and cumulative effects are not addressed and need to be.
4. We understand the effects analysis is focused on threatened and endangered (T & E) species, however we want to remind DWR and ICF that if the Army Corps of Engineers is to use this NEPA document to support a CWA Section 404 permit, the direct, secondary (indirect is NEPA language), and cumulative impacts of BDCP projects must be estimated and disclosed for non T & E wildlife and aquatic resources per NEPA and CWA. Specifically relevant to the CWA Section 404 permit are the direct, secondary, and cumulative impacts of project actions on designated uses of Delta waterways that have been adopted by the State of California under the delegated CWA Water Quality Standards program. Estimation and disclosure of impacts to wildlife and other aquatic life are also required under NEPA. Please let us know if this information is located somewhere else in the document.
5. Similarly, methods used to evaluate the impact of the preliminary proposal on exposure of T & E species and other wild and aquatic life to toxins must be robust enough to inform regulatory decisions.
6. We recommend describing how this Appendix D (and other companion appendices) and the Effects Analysis are being used, e.g., to refine alternatives, inform EIR/EIS for impact analysis and mitigation.
7. We recommend summarizing the analytical process and decision rules used to reach the conclusions. The components of the preliminary proposal that could be ‘drivers’ affecting water quality should be identified. For example, describe the actions associated with the Delta Conveyance (water operations, construction, dredging, etc...) that may impact or drive changes in T & E species exposure to toxins. Do the same for restoration actions including areas other than Yolo Bypass.
8. Discuss or clarify the role of modeling and analysis completed for the flows/turbidity Appendix in the toxins analysis.

Commented [J1]: I would go further here but I risk showing personal bias but I'll plead my case nonetheless... the mercury section appears to draw from 3 primary sources and those appear improperly weighted. 1) Alpers DRERIP model – a conceptual model of Hg cycling prepared by a group of leading Hg specialists, peer-reviewed and drawing from wide literature review is mentioned briefly and not entirely accurately when done, 2) Wood's TMDL report, a good report from the regulatory perspective but used to support known data but not much beyond the surficial analysis and incorporation of non-peer reviewed data and speaking of... 3) the bulk of the weight of the literature/info appears to be derived from non-peer reviewed reports conducted and prepared by a single group of researchers. Most of the recent literature and on-going data collection for mercury research is ignored or omitted.

Commented [J2]: Yes!, true for all “toxins”

Commented [J3]: I completely agree, it seems to me that this appendix should identify current conditions/threats, then identify what threats will be most affected (negatively) by the proposed action, then dig down into the details of those toxins cycling to address regulatory, management, mitigation, design options.

Commented [J4]: Yes yes yes!

Executive Summary

1. Table D-1 is **confusing**. The explanation says it is an overview of conclusions drawn from the toxins analysis but in the notes at the end the color coding says it is probability of [species] occurrence in the area. The color coding terms “none, low, moderate, and high” are defined at the beginning of the table.
 - a. Recommend combining the definition of terms and color coding in one place.
 - b. Reconcile the color coding with the term definitions, is it species presence? Or is it species/life stage occurrence with toxins. Or is it potential “threat” or “effect” (aka “impact in regulatory lingo)
 - c. Using consistent coloring with Table D-7. Table D-1 appears to be a condensed version of Table D-7 which is in black and white and uses similar but not identical terms (none, low, medium, high). These tables should be consistent with one another.
2. It would be helpful to provide text in the Executive Summary to accompany and explain the table.

Commented [J5]: YES it is!

Commented [J6]: Yes!!

Section D.2 Organization of Appendix

1. Provide estimates of direct, indirect (secondary in CWA), and cumulative impacts from changes in species exposure to toxins that result from preliminary proposal actions for each T & E species as well as other aquatic species and aquatic dependent wildlife. Describe where this information is located in the EIS if it is not included here. Describe why this information is not included here if it is provided elsewhere in the document.
2. Provide a citation/endnote listing the groups that recognize the stressors included in this section as significant to determining the potential of the Bay-Delta ecosystem to support covered species. This will support the statement of “wide recognition,” increase the integrity of the document, and support the choices to include specific stressors and exclude others. Examples include DSC ISB stressors panel work, IEP POD documents, CWA Section 303(d) list of water quality impairments that identify toxins as sources of aquatic resource designated use impairments, and NRC other stressors work/assignment.
3. Improve the description of the current state of toxins in the Delta. **This piece is mostly missing from each section.** The following information should be provided describing the current state of each toxin in its relevant section.
 - a. Stressors listed as the source of designated use impairments in the Delta on the CWA 303(d) List of Impaired Waterbodies.
 - b. Provide water quality criteria/objectives adopted by CA in the water quality control plans? The Sacramento and San Joaquin River Basin Plan is available here http://www.swrcb.ca.gov/centralvalley/water_issues/basin_plans/index.shtml and the Sacramento-San Joaquin River Delta Water Quality Control Plan is available here http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/wq_control_plans/2006wqcp/index.shtml.
 - c. Provide the federal guidance criteria (we realize they are provided in some sections).

Commented [J7]: yes

- d. Disclose whether or not the stressor is exceeding water quality objectives or federal guidance criteria. Include information about where water quality objectives are exceeded and how often. A map is a good way to communicate these concepts.
- e. Identify the stressors that have been documented to cause aquatic toxicity and when? What are the sources?
- f. Which of the stressors have adopted TMDLs with waste load and load allocations limiting discharges to the Delta? Which stressors have TMDLs in development?
- g. Provide the waste load and load allocations and how they may affect or be implemented by the preliminary proposal.

Section D.3.1 Selection of Water Quality Stressors for Analysis

1. Describe the process for selecting water quality stressors for analysis.
2. Recommend moving the paragraph "The environmental toxins discussed below were selected based on historical and current land use ..." and the bullets outlining mercury, selenium, copper, ammonia, and pesticides to the front of the section.
3. This section does not adequately consider impact from upstream urban and agricultural areas.
4. The emphasis on land area (e.g., 9% urban) is misleading because significant pollution is often associated with intensity of activities (urban), concentrated hot spots or location-specific practices (selenium, methylmercury, and agricultural pesticides).
5. The small percentage of urban land in the Delta is not a legitimate reason to provide less detail on urban toxins and how they may change as a result of the preliminary proposal. The Delta is the receptor of urban runoff from very large urban and agricultural centers located immediately upstream of the Delta. The document states many times, including this section, that urban land use accounts for only 9% of the Delta area. This statement is used as a reason to provide less detail on urban contaminants and indicates that pollutants/toxins in urban runoff should not be a big concern. However, contaminants are the source of aquatic toxicity and impairments to aquatic resource designated uses in the Delta. And contaminants-caused impairments persist in the Delta, regardless of the urban land use coverage in the Delta.
 - a. Recommend balancing the discussion by identifying the Delta is the downstream collector of toxins in runoff from large urban and agricultural areas.
 - b. Recommend explicitly describing the reasons a more rigorous analysis was not provided or has not been done.
6. Support this statement "Rural developments associated with agricultural land use have minimal water quality impacts," by providing a citation and/or explanation for the statement. OR remove the statement if it is not supported by academic literature or water quality monitoring programs.
 - a. Provide examples of the types of water quality impacts rural developments have, especially in the Delta with septic systems located below sea level.
 - b. Describe and reference water quality data that show the levels of rural development water quality impacts as minimal compared to other sources.

Commented [J8]: or upwind (airshed as well as watershed for Hg))

Commented [J9]: I agree!!!

7. Recommend consulting the CWA Section 303(d) List (http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml) and using it as a source for informing the choice of toxins to consider evaluating in this section.

Section D.4 Methods

1. Methods used in this analysis need to be clearly described in Appendix D.
2. Methods need to be robust enough to inform regulatory decisions.
3. Use CA adopted water quality objectives and TMDL load allocations as referents.
 - a. These are available in water quality control plans and TMDLs. Use both the narrative and numeric objectives and list load allocations and waste load allocations (if applicable).
 - b. This is very important because the CWA restricts permitting under Section 404 to those projects that do not “cause **or contribute** (emphasis added) to violations of any applicable State water quality standard” (40 CFR 230.1(b)(1)). Water quality standards include water quality criteria (called objectives in California plans) and adopted designated (CA term is beneficial) uses which address aquatic resources and habitat for a broad range of species.
 - c. This step is also important for compliance with adopted TMDLs. TMDL load allocations and waste load allocation (if applicable) are necessary to compare the impact of proposed actions on toxin loads to the Delta for compliance with adopted TMDLs.
 - d. The Corps and State Board need this information in the NEPA document if they are to use it as the foundation for decision making in CWA 404 and 401 permit and certification processes.
4. NEPA and CWA require disclosure of impacts on more than just T & E species. Please identify the location in the EIS that evaluates the impact of toxins on other wildlife and aquatic life that are not listed species.
5. Operations may not be the only significant source of changes to T & E species exposure to toxins. Please include an evaluation of Delta Conveyance construction impacts on exposure of each of the toxins considered in this Appendix D to T & E species. For example, dredging that is done for constructing the pipeline will pull sediments into the water column potentially contributing to low dissolved oxygen levels and exposure to persistent sediment-bound toxins such as organochlorines and pyrethroid pesticides.

Commented [J10]: Consider other TMDLs in addition to SFBay and Delta... Ridolfi et al., 2010 Tomales Bay TMDL report provides some compelling data on the importance of habitat over external Hg sources in MeHg contamination and bioaccumulation.

Section D.5.1 Mercury

1. Describe the current status of methylmercury water quality problem.
 - a. Use the updated 2010 303(d) List instead of the 2007 citation. It is available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
 - b. We recommend providing a map showing the 303(d) waters with designated uses impaired by methylmercury in the Delta, locations of the greatest source loads, and locations where monitoring data show levels of methylmercury that exceed load and/or objectives.
 - c. Monitoring data can be accessed through the Lines of Evidence (LOE) links provided on the 303(d) List which can be accessed by the link provided above.
 - d. Describe how often water quality objectives are exceeded and where.

Commented [J11]: these are far from complete... limited by monitoring data. there is a currently funded project by the state board to try to better address the gaps in a more feasible (financially) statistical approach

- e. Provide and discuss wildlife selenium objectives for leasts tern and river otters developed for TMDLs by San Francisco Bay Water Board.
2. Update the text to be consistent with the Delta Methylmercury TMDL adopted by CVRWQCB on April 22, 2010.
 - a. Describe the recently-adopted methylmercury tissue objectives for the Bay Delta and TMDL. These objectives can be converted to a water column value for total mercury.
 - b. Describe how TMDL implementation requirements apply to actions in the preliminary proposal.
 - c. Important documents read and incorporate include:
 - i. The TMDL document or resolution R5-2010-0043 *available at* http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/resolutions/r5-2010-0043_res.pdf
 - ii. Staff Report on Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Methylmercury and Total Mercury in the Sacramento-San Joaquin Delta Estuary *available at* http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/april_2010_hg_tmdl_hearing/apr2010_bpa_staffrpt_final.pdf.
3. Improve the discussion of mercury location, environmental fate, and transport by describing and including these studies:
 - a. Methylmercury cycling, bioaccumulation, and export from agricultural and non-agricultural wetlands in the Yolo Bypass. http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/other_technical_reports/ybwa_hg_final_rpt.pdf
 - b. Ackermann, J.T., and Eagles-Smith, C.A., 2010, Agricultural wetlands as potential hotspots for mercury bioaccumulation: Experimental evidence using caged fish. *Environmental Science and Technology*, v. 44 p. 1451-1457.
 - c. Avramescu, M-L, E. Yumvihoze, H. Hintelmann, J. Ridal, D. Fortin, and D.R.S. Lean, 2010, Biogeochemical factors influencing net mercury methylation in contaminated freshwater sediments from the St. Lawrence River in Cornwall, Ontario, Canada. *Science of the Total Environment* 409:968–978
 - d. Bergamaschi, B.A., J.A. Fleck, a B.D. Downing, E. Boss, B. Pellerin, N.K. Ganju, D.H. Schoellhamer, a A.A. Byington, W.A. Heim, M. Stephenson, and R. Fujii, 2011, Methyl mercury dynamics in a tidal wetland quantified using in situ optical measurements, *Limnol. Oceanogr.*, 56(4):xxx-xxx
 - e. EAGLES-SMITH, C. A., AND J. T. ACKERMAN. 2009. Rapid changes in small fish mercury concentrations in estuarine wetlands: Implications for wildlife risk and monitoring programs. *Environ. Sci. Technol.* 43: 8658–8664, doi:10.1021/es901400c
 - f. Hall, B.D., Aiken, G.R., Krabbenhoft, D., Marvin-DiPasquale, M., Swarzenski, C.M., 2008, Wetlands as principal zones of methylmercury production in southern Louisiana and the Gulf of Mexico region: *Environmental Pollution*, v. 154, p.124–134.

g. MERRITT, K. A., AND A. AMIRBAHMAN. 2009. Mercury methylation dynamics in estuarine and coastal marine environments—a critical review. Earth-Sci. Rev. 96: 54–66, doi:10.1016/j.earscirev. 2009.06.002

h. WHALIN, L., E. H. KIM, AND R. MASON. 2007. Factors influencing the oxidation, reduction, methylation and demethylation of mercury species in coastal waters. Mar. Chem. 107: 278–294, doi:10.1016/j.marchem.2007.04.002

i. Windham-Myers, L., M. Marvin-Dipasquale, D.P. Krabbenhoft, J.L. Agee, M.H. Cox, P. Heredia-Middleton, C. Coates, and E. Kakouros, 2009, Experimental removal of wetland emergent vegetation leads to decreased methylmercury production in surface sediment, JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 114, G00C05, doi:10.1029/2008JG000815

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4. Water operations

- a. Explain why quantification is not possible or meaningful. Quantification is possible for the Flows, Turbidity, Temperature, and Salinity Appendix. Explain why these models and their results are not being used to inform potential changes in T & E species exposure to toxins.
- b. Describe how changes in circulation caused by operations impact mercury and methylmercury exposure to T & E species and other aquatic and wildlife.
- c. Quantitative estimates of the impact of water operations on the production, transport, and impact of methylmercury on T & Species (identified by loads and water column and fish tissue concentrations) and other aquatic and wildlife in the Delta must be provided in order to determine whether or not the Delta Conveyance Project and its operations cause or contribute to violations of water quality standards. If this information is not provided, the Army Corps of Engineers will need to supplement the NEPA documentation and/or federal regulations at 40 CFR 230.12(a)(3)(iv) may prohibit the Army Corps of Engineers from granting a CWA Section 404 permit.
- d. Provide a clear conclusion statement describing the effect of operations on mercury and methylmercury exposure to T & Species (identified by loads and water column and fish tissue concentrations) and other aquatic and wildlife in the Delta.
 - i. Include impacts to the dominant harvested fishes of the delta – striped bass, largemouth bass and other centrarchid fish, and the various catfish. These fish are heavily harvested both in expensive tournaments that attract fishermen from across the continent and for subsistence, especially of many minority populations.
 - ii. This will help to address the economic impacts and economic justice aspects of fish harvest in the delta and how they are affected by changes in fish uptake of contaminants caused by preliminary proposal actions.

5. Restoration

- a. Describe the actions BDCP agencies would be required to carry out under the MeHG TMDL. BDCP agencies manage controllable factors that contribute to MeHG production, and they are subject to requirements under the recently adopted MeHG TMDL. Largely, this relates to monitoring and control studies in open water and flood plain environments. We recommend reading the TMDL and staff report and updating this document accordingly.
- b. Page D-11 contains the observation that the effects of the preliminary proposal on exposure of T & E species to methylmercury cannot be quantified due to the complexity of processes

producing methylmercury. Phase 1 of the TMDL requires control studies in which action agencies are required to participate. BDCP should be prepared to commit to these requirements and use the information to provide better estimates (ideally quantitative) of T & E species exposure to methylmercury when the restoration projects reach the project level of detail, for example in the CWA Section 404 permit application phase.

- c. Describe how changes in water circulation and velocity caused by operating the Delta Conveyance Project will impact mercury and methylmercury exposure to T & E species and other aquatic and wildlife throughout the Delta.
- d. Provide a clear conclusion statement describing the effect of operations on mercury and methylmercury exposure to T & E species (identified by loads and water column and fish tissue concentrations) and other aquatic and wildlife in the Delta.
- 6. Modeling results
 - a. Please provide details on the quantitative modeling such as inputs, equations, chosen constants and results.
 - b. Describe modeling results and provide a context for interpretation such as water quality objectives.
- 7. Conclusions
 - a. Short term impacts to populations of Delta T & E species cannot be disregarded given record low abundances.
 - b. A robust and valid quantification of the effect of the preliminary proposal on mercury and methylmercury exposure to T & E species is a necessary piece of information on which to base CWA permits and certifications.

Section D.5.2 Selenium

- 1. This section reflects an outdated understanding of the state of selenium water quality problems in the Delta. Please read the following resources, follow up with endnote citations, and update the document accordingly:
 - a. Unabridged Advanced Notice of Proposed Rule-making on Water Quality Challenges in the San Francisco Bay Delta Estuary *available at* http://www.epa.gov/region9/water/watershed/sfbay-delta/pdf/BayDeltaANPR-fr_unabridged.pdf
 - b. Nonpoint Source Program Success Story: Grasslands Bypass Project Reduces Selenium in the San Joaquin Basin *available at* http://water.epa.gov/polwaste/nps/success319/upload/ca_sanjoaquin.pdf
 - c. **Ecological Assessment of Selenium in the Aquatic Environment**
Editor(s): Peter M. Chapman, *Golder Associates, Vancouver, British Columbia, Canada*; William J. Adams, *Pace University*; Marjorie Brooks, *University of Wyoming, Laramie, USA*; Charles G. Delos, *U.S. Environmental Protection Agency, Washington, D.C., USA*; Samuel N. Luoma, *U.S. Geological Survey, Menlo Park, California, USA*; William A. Maher, *University of Canberra, Australia*; Harry M. Ohlendorf, *CH2M HILL Inc., Sacramento, California, USA*; Theresa S. Presser, *U.S. Geological Survey, Menlo Park, California, USA*; Patrick Shaw, *Environmental Canada, Vancouver, Canada*

- d. **Selenium TMDLS**
- i. Grasslands Marshes Selenium TMDL
http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/grasslands_se/index.shtml
 - ii. Salt Slough Selenium TMDL
http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/salt_slough_se/index.shtml
 - iii. San Joaquin River Selenium TMDL
http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/san_joaquin_se/index.shtml
 - iv. North San Francisco Bay Selenium TMDL
http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/selenium_tmdl.shtml
- e. Model development CASCaDE II <http://cascade.wr.usgs.gov/>
2. Describe the current status of selenium water quality problem.
- a. Explicitly identify that water column selenium concentrations are not reliable indicators of risk to biota.
 - b. Use the updated 2010 303(d) List instead of the 2007 citation. It is available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
 - c. List CA adopted water quality objectives.
 - d. Discuss the update to selenium water quality guidance criteria. Currently, in response to concerns that the existing regulatory standards for selenium are not protective, EPA Region 9 is developing regulatory criteria for selenium that will be applicable to wildlife and aquatic species in the Bay-Delta. Working with the US FWS and NOAA Fisheries, this process is preparing an analysis of species effects levels, including Bay-Delta listed species sensitivity to dietary selenium. EPA expects to complete the work and issue the public draft proposal in mid-2012. Please see the EPA website for information that should be of use in revising the selenium section of Appendix D: <http://www.epa.gov/region9/water/ctr/>.
 - e. Recommend a map showing the 303(d) impaired waters and the greatest sources of loads.
 - f. Identify areas using a map that are and are not in compliance/meeting existing Se objectives.
 - g. Describe how often water quality objectives are exceeded and conditions under which selenium concentration in species rise.
 - h. Discuss the anticipated update to selenium objectives and the reasons for the update which are based on current objectives not being protective enough of aquatic resources.
 - i. A quantitative model for selenium that includes the Delta was developed for the North Bay TMDL. We recommend updating this document with text that summarizes the North Bay Selenium TMDL regarding Se sources and controls and using the quantitative model to estimate the impact of BDCP on the availability of selenium for biological uptake and impairment. Also be sure to evaluate USGS work on the CASCaDE II model Model development CASCaDE II <http://cascade.wr.usgs.gov/>
3. The Effects Analysis should consider whether changes in Delta Conveyance would alter transport and deposition of selenium in the Delta.

- a. Describe how changes in circulation caused by operations impact selenium exposure and toxicity to T & E species and other aquatic and wildlife. stabilized flow conditions are likely to allow more stable populations of overbite clams in the western delta and eastern Suisun Bay, which can be expected to increase the impacts of selenium on sturgeon and other benthic feeding fish. Some of these changes are described here http://www.mercurynews.com/science/ci_18903921.
 - b. Describe the impact of Delta Conveyance operations increasing the amount of San Joaquin River water that flows through the Delta (water that is generally cycled back through the pumps prior to entering the Delta using the current system) on selenium loads and potential for toxicity to T & E species.
 - c. The discussion of mitigating factors, such as reduced selenium loads resulting from TMDLs should come second. The San Joaquin Basin is important to discussion of selenium effects in the Delta and Bay because: a) the Basin is the main controllable source of selenium in the B-D watershed; b) there is a program in place to reduce (or largely eliminate) these loads, although the means of accomplishing reductions to protective levels are controversial and/or uncertain; and c) during certain periods, Delta operations strongly influence the amount of selenium that enters the Delta (capturing San Joaquin selenium loads in export supplies).
4. Estimation of exposure of T & E species to selenium toxicity is incomplete without providing information of foodweb characteristics because they are a significant variable in selenium exposure and toxicity. The potential for selenium toxicity should be evaluated using foodweb/ ecosystem and estuarine dynamics models that link important variables affecting selenium bioavailability, bioaccumulation and exposure. We recognize that the effects of toxins on foodwebs is addressed in a separate appendix, however the impact of the preliminary project on selenium toxicity to T & E species cannot be complete without including a description of foodweb pathways mediating bioavailability for exposure and bioaccumulation.
 5. Identify species with increased probability of experiencing selenium toxicity as a result of Delta Conveyance operations or other preliminary project actions.
 6. Discuss what needs to be learned about the processes driving the variations in selenium concentrations in Bay Delta foodwebs (e.g., inter-annual variations in clam uptake)
 7. Revise and fact check the text on pages D19-D20 on the Grasslands area of the westside San Joaquin Basin (not the Delta) with the Bay Delta ANPR (see comment #1 for link) and the SFEI Grasslands Bypass Project <http://www.sfei.org/grassland/>.
 8. The statement "Decreased Sacramento River flows into the Delta as a result of the preliminary proposal are expected to result in minimal effects on selenium water concentrations in the Delta," is unsupported by text in the document. Concluding that the potential for the preliminary proposal to have minimal effect on T & E species seems premature especially since a few pages earlier the text of Appendix D states that diet-based differences in bioaccumulation have not been accounted for in this chapter.

Section D.5.3 Copper

1. The conclusion “it is not expected that the preliminary proposal would substantially change the exposure of fish to copper,” does not appear to be supported given following:
 - a. Statement from previous paragraph, “Mobilization of copper from increased flow at the weir at the upstream end of the Yolo Bypass, where copper concentrations are elevated, could have a temporary adverse effect on juvenile fish, namely salmonids, splittail, and smelt that rear in that area.”
 - b. Very low levels of copper interfere with the nasal epithelium of salmon and hinder their ability to return to their spawning grounds years later. The various successful efforts to ban copper in brake pads is largely due to this work. A seminal abstract concludes for coho salmon “copper is broadly toxic to the salmon olfactory nervous system. Consequently, short-term influxes of copper to surface waters may interfere with olfactory-mediated behaviors that are critical for the survival and migratory success of wild salmonids.”
(Baldwin et al. 2003 available at:
<http://training.fws.gov/EC/Resources/pesticides/Aquatic%20Effects/Sublethal%20Effects%20of%20Copper%20on%20Coho%20Salmon.pdf>)
 - c. Impairments to coho develop at concentration of 2ug/L –Sandahl *et al* (2007) ES & T 41:2998-3004.
 - d. Destroying the ability of salmon to find their natal streams for even just a few years appears to be a significant consequence of the preliminary project.

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Section D.5.4 Ammonia/Ammonium

1. Describe the current status of ammonia as a water quality problem.
 - a. What water quality criteria/objectives are used to evaluate ammonia and ammonium?
 - b. Are any waters listed as impaired due to ammonia/ammonium? The current 303(d) list is available at
http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
 - c. Provide a balanced and comprehensive description of the research on ammonia/ammonium in the Bay Delta and where ammonia/ammonium is thought to have impacts that may be connected to the POD.
2. Make a clear statement about the impact of water operations on the toxicity of ammonia/ammonium on the Delta and describe the technical information/analyses with citations that support this conclusion.
3. Two or three of the proposed Delta Conveyance would be located upstream of the Sacramento Regional WWTP outfall. These are the intakes that would be used more often. The conclusion that little or no effects are expected from the preliminary proposal on ammonia/ammonium levels prior to full compliance with the new NPDES permit for the WWTP is not supported.
4. Put the above statement in context and compare the time frames for fully operational ammonium and nitrate removal and the beginning of water operations.
5. Describe the impact of water operations prior to ammonium and nitrate removal.
6. Extend analysis down to Suisun Bay.

Section D.5.5 Pyrethroid Pesticides

1. Describe the current status of pyrethroid water quality problem.
 - a. Refer to the updated 2010 303(d) List. It is available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
 - b. List CA adopted water quality objectives, even if only narrative toxicity criteria. You can find it in the Sacramento River and San Joaquin River Water Quality Control Plan.
 - c. Recommend a map showing the 303(d) impaired waters and the greatest sources of loads. You will need to extend outside of the Delta for this exercise.
 - d. Identify areas using a map that showed aquatic toxicity in urban runoff from pyrethroids and the location of the Sac Regional WWTP outfall that also discharges pyrethroids.
 - e. Describe how often are water quality objectives exceeded.
 - f. Discuss upcoming Central Valley Basin Plan Amendment and TMDL for Pesticides (including pyrethroids).
2. Water operations – Evaluate loss of assimilation capacity from taking cleaner Sacramento River water out of the system as well as loss of circulation and volume in the southern Delta water ways.
3. Restoration – Discuss potential for pesticides to be used in mosquito abatement programs over wetlands after restoration takes place.

Section D.5.6 Organochlorine Pesticides

1. Describe the current status of organochlorine water quality problem.
 - a. Refer to the updated 2010 303(d) List. It is available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
 - b. List CA adopted water quality objectives, even if only narrative toxicity criteria. You can find it in the Sacramento River and San Joaquin River Water Quality Control Plan.
 - c. Recommend providing a map showing the 303(d) impaired waters and the greatest sources of loads. You will need to extend outside of the Delta for this exercise.
 - d. Describe how often and where water quality objectives are exceeded.
 - e. Discuss upcoming Central Valley Organochlorine Basin Plan Amendment and TMDL.
2. Typo – organophosphate is incorrectly used (should be organochlorine) in a number of different places in this section.
3. Evaluate the short term effects of increases in organochlorine exposure from flooding Yolo Bypass on juvenile salmon. The mobilization of organochlorines from inundating farmland may have a potential for high impacts on young salmon and other species that we expect to use those inundated habitats. The much greater uptake of mercury for salmon in the Yolo Bypass suggests that other, more toxic materials are also likely to be picked up and bioaccumulated readily. Growth dilution may make this less important in the adults that survive to grow several orders of magnitude larger than the fish in the bypass, but the short term effects on the juveniles should be addressed more thoroughly.
4. Water operations – Evaluate loss of assimilation capacity from taking cleaner Sacramento River water out of the system as well as loss of circulation and volume in the southern Delta water

ways. It is also important to evaluate specific Delta Conveyance actions, such as dredging, on the exposure of T & E species to organochlorines.

Section D.5.7 Organophosphate Pesticides

1. Describe the current status of organophosphate water quality problem in the Delta.
 - a. Refer to the updated 2010 303(d) List. It is available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
 - b. List CA adopted water quality objectives, even if only narrative toxicity criteria. You can find it in the Sacramento River and San Joaquin River Water Quality Control Plan.
 - c. Recommend providing a map showing the 303(d) impaired waters and the greatest sources of loads. You will need to extend outside of the Delta for this exercise.
 - d. Describe how often and where water quality objectives are exceeded.
 - e. Discuss upcoming Central Valley Pesticides Basin Plan Amendment and TMDL, organophosphates are addressed in Phase I.
2. Water operations – Evaluate loss of assimilation capacity from taking cleaner Sacramento River water out of the system as well as loss of circulation and volume in the southern Delta water ways.
3. The statement, “Because the organophosphates are distributed throughout the Delta, changes in hydrology and mixing in the Delta due to preliminary proposal water operations should not affect the distribution or mobilization of these chemicals,” is not supported by any information provided in the document.

Section D.5.8 Endocrine Disruptors

Section D.5.9 Other Urban contaminants

1. Nonnative Aquatic Vegetation Control – need to mention BO’s are up for renewal on Weedard, Rodeo, R-11. NMFS recently delayed release.

Section D.6

1. Condensation of unsupported conclusions that operations and restoration will not negatively impact T & E species by altering availability of and exposure to toxins.